by Dr. O. L. Fassig in his paper on the daily barometric wave.

A very successful photograph of the members of the convention was taken on Thursday, noon, copies of which, on the scale of 17 by 11, can be had for $1.25 by applying to Mr. W. M. Wilson, Section Director, Milwaukee, Wis. We take pleasure in adding to our illustrations of the current number of the REVIEW a reduced print of this interesting picture, Plate I.

WEATHER BUREAU MEN AS INSTRUCTORS.

Mr. John R. Weeks, Observer, Weather Bureau, addressed the State Convention of Cotton Growers that met at Macon, Ga., on July 12. Upon his invitation, many of the delegates visited the local Weather Bureau office for the purpose of familiarizing themselves with the general work of the National Weather Bureau.

CORRIGENDA.

MONTHLY WEATHER REVIEW for June, 1901, make the following corrections:

On page 253, column 2, line 6 from bottom, for "following" read "preceding."

On page 253, column 2, line 7 from bottom, for "division is" read "divisions are."

On page 257, column 1, note at bottom of table, omit "the sea."

On page 263, column 2, line 29, for "marked" read "masked."

On page 265, column 2, line 16 from bottom, for "lunistice" read "lunisticii."

On page 268, column 1, line 29 from bottom, for "one-fifth per cent" read "1.5 per cent."

On page 268, column 2, line 5 from bottom, for "five thousand million" read "twenty-five thousand million."

THE WEATHER OF THE MONTH.

By P. C. DAY, Acting Chief Division Meteorological Records.

CHARACTERISTICS OF THE WEATHER FOR JULY.

The one overshadowing feature of the weather for the month was the long and practically unbroken period of intense heat and drought that prevailed during the month over the great central valleys of the country.

The blighting effect of the merciless rays of the sun day after day, supplemented by an almost entire absence of rainfall, threatened the great agricultural regions with ruin so widespread and disastrous as to be scarcely estimated.

Rains and cooler weather the last few days of the month, however, materially changed the outlook and modified to some extent the effects of the most widespread and disastrous hot wave and drought in the history of the country.

PRESSURE.

The distribution of monthly mean pressure is graphically shown on Chart IV and the numerical values are given in Tables I and VI.

Pressure conditions did not differ materially from the normal, except that the permanent area of low pressure over the plateau and plains region was somewhat intensified and extended eastward considerably beyond its normal boundaries. The areas of high and low pressure that moved across the country were generally ill-defined and lacking in energy, in fact, a notable feature of the month was the inconsequential barometric changes from day to day and the resulting stagnation of the lower strata of the atmosphere. Compared with the normal, pressure for July was slightly in excess over a narrow strip along the immediate Atlantic coast from Florida to the Maritime Provinces of Canada and along the extreme northern edge of the Great Lakes. Over the remainder of the country pressure was below the average, attaining a maximum departure below of from 0.10 to 0.15 inch over the Great Basin and Plains region.

Over the region extending from the Rocky Mountains westward to the Pacific and from the lower lakes eastward and southeastward to the Atlantic coast, the pressure for July was generally lower than for the previous month. Over the valleys of the Mississippi and Missouri, the southern Plateau region and the upper lakes pressure was slightly in excess of that for June.

TEMPERATURE OF THE AIR.

The distribution of monthly mean surface temperature, as deduced from the records of about 1,000 stations, is shown on Chart VI.

The hot wave of July, 1901, over the central valleys, embracing the great corn belt of the United States, had its inception in the latter part of June and continued with scarcely a break till about the 27th of July, making a record of continuous heat that will probably be the standard for future years. During this period the sky was practically free from clouds, and day after day the unobstructed rays of the sun were poured upon the parched and sun-dried earth.

Even the nights afforded little relief, for while the absence of clouds ordinarily favors radiation of heat from the earth at night, normal conditions appeared to be totally suspended and the air retained its heat during the nights in a manner that appeared remarkable.

Throughout portions of Missouri and eastern Kansas and Nebraska the daily maximum temperature averaged 100° or more from the 25th of June to the end of July. At Beaver City, Nebr., from June 23 to July 31, inclusive, the maximum temperature averaged 104°, and only on three days during the entire period of thirty-nine days, did the maximum temperature fall below 100°. At Columbia, Mo., from June 22 to July 25, inclusive, a period of 34 days, the maximum temperature averaged over 100°, records probably unsurpassed in the history of the country, except in the desert portions of southern California and Arizona. Throughout all the great corn-growing States of the central-west all previous records, both of the monthly means and maximum temperature were exceeded, and yet a surprising feature of the crop conditions at the end of the month was that so large a proportion of the unmatured crops had stood the fiery ordeal so long without more material injury.

Compared with the normal, the temperature for July was everywhere in excess, except a narrow strip along the Pacific coast and over limited areas of eastern Georgia and the Florida Peninsula. Over all the region from the Appalachian to

the Rocky Mountains, temperatures were far above the normal, attaining a maximum positive departure of nearly 10° daily over the States of the lower Missouri Valley. Over a large section of this area the maximum temperatures exceeded any previously recorded in the history of the Weather Bureau.

Maximum temperatures of 110° and over were recorded at practically all points in Missouri, and over large sections of eastern Kansas and Nebraska, southern Iowa and Illinois, and northern Arkansas and Oklahoma. Maximum temperatures of 110° and over were also recorded in western North and South Dakota and eastern Montana, and over the desert regions of California and Arizona. In order to more clearly illustrate the areas of abnormal maximum temperatures the chart showing the same has been published separately this month, instead of in connection with the values of mean and minimum temperatures as usual. (See Chart IX.)

The average temperature for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	10	69.7	+ 1.9	— 2.3	— 0.3
Middle Atlantic	12	78.2	+ 3.5	— 1.6	— 0.2
South Atlantic	10	80.9	+ 1.1	—10.6	— 1.5
Florida Peninsula	7	81.8	+ 0.2	—12.5	— 1.8
East Gulf	7	82.1	+ 1.1	— 8.4	— 1.2
West Gulf	7	83.7	+ 1.9	+ 4.1	+ 0.6
Ohio Valley and Tennessee	12	81.6	+ 4.6	— 4.2	— 0.6
Lower Lake	8	75.7	+ 4.4	— 0.9	— 0.1
Upper Lake	9	71.0	+ 3.7	+ 8.1	+ 1.2
North Dakota	8	72.3	+ 3.6	+24.7	+ 3.5
Upper Mississippi Valley	11	82.5	+ 7.3	+13.1	+ 1.9
Missouri Valley	10	83.5	+ 8.3	+23.8	+ 3.4
Northern Slope	7	74.3	+ 4.9	+16.9	+ 2.4
Middle Slope	6	82 0	+ 5.8	+10.3	+ 1.5
Southern Slope	6	81.8	+ 2.5	+ 4.0	+ 0.6
Southern Plateau	15	79.7	+ 1.4	+ 3.2	+ 0.5
Middle Plateau	9	76.3	+ 2.2	+10.2	+ 1.5
Northern Plateau	10	69.3	+ 1.7	+ 7.8	+ 1.1
North Pacific	9	59.1	— 3.0	— 8.7	— 1.2
Middle Pacific	5	63.3	— 1.2	— 2.2	— 0.3
South Pacific	4	70.6	0.0	+ 3.3	+ 0.5

In Canada.—Prof. R. F. Stupart says:

The temperature was below the average from 1° to 3° in the western and northwestern portions of the Territories, also over British Columbia, and above the average elsewhere throughout Canada, except in the extreme northwestern portion of Quebec, where the average was just maintained. In Toronto the mean for July of this year (73°), which is 6° above the average, has only been equaled once during the past sixty years, namely, in 1887, and only exceeded once, namely, in 1868, when a mean of 75° was recorded; consequently, it is fair to assume that as over the greater portion of Ontario the mean was from 5° to 6° above average July, 1901, in Ontario was one of the warmest Julys on record. The mean in Manitoba was also as much as 3° to 4° above the average, as was also the case in several portions of the Maritime Provinces.

PRECIPITATION.

Along the entire northern border of the country and generally east of the Appalachian Mountains the rainfall was in excess of the normal and its distribution such as to promote the growth of all staple crops. Precipitation was also in excess over portions of the west Gulf coast and eastern Florida. From the Appalachian Mountains westward to the Pacific coast the monthly precipitation was below the normal, and over the entire corn belt and the northern portion of the cotton growing States the average was less than 50 per cent of normal. Over large portions of the above area practically no well distributed rains occurred until the last few days of the month, and growing crops were threatened with complete destruction.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	10	3.02	88	—0.4	+ 1.0
Middle Atlantic	12	3.96	93	—0.3	— 2.6
South Atlantic	10	5.78	95	—0.3	+ 1.1
Florida Peninsula	7	5.98	92	—0.5	+ 3.4
East Gulf	7	6.40	105	+0.3	— 0.6
West Gulf	7	3.16	103	+0.1	—10.1
Ohio Valley and Tennessee	12	1.66	41	—2.4	— 8.4
Lower Lake	8	3.09	100	0.0	— 2.0
Upper Lake	9	4.37	142	+1.3	— 3.0
North Dakota	8	3.80	136	+1.0	+ 0.6
Upper Mississippi Valley	11	2.41	65	—1.3	— 6.2
Missouri Valley	10	2.19	56	—1.7	— 5.9
Northern Slope	7	1.74	106	+0.1	+ 1.1
Middle Slope	6	1.34	47	—1.5	— 4.3
Southern Slope	6	1.33	44	—1.7	— 2.1
Southern Plateau	15	1.20	86	—0.2	+ 0.9
Middle Plateau	9	0.18	38	—0.3	— 0.2
Northern Plateau	10	0.32	62	—0.2	— 1.6
North Pacific	9	0.60	67	—0.3	+ 0.6
Middle Pacific	5	0.08	100	0.0	— 0.8
South Pacific	4	T.	100	0.0	+ 1.9

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 2, 14, 15, 16, 17, 18, 31. Arizona, 22, 24. Arkansas, 5, 22. Colorado, 18, 24. Connecticut, 2, 3, 11, 19. Delaware, 8, 17. Georgia, 12, 13, 14, 25, 26. Idaho, 3, 9. Illinois, 17, 24, 28, 30. Indiana, 17. Indian Territory, 5. Iowa, 17, 24, 27, 30. Kansas, 2, 5, 15, 18, 23, 24, 27, 29. Kentucky, 17. Louisiana, 13, 14. Maine, 18. Maryland, 2, 7, 17. Michigan, 9, 17, 19, 21. Minnesota, 1, 4, 14, 17, 23, 25. Mississippi, 6, 16, 17. Missouri, 5, 15, 17, 23. Montana, 7, 8, 10, 11, 13, 15, 16, 18, 26, 27. Nebraska, 1, 2, 4, 17, 18, 28, 30. New Hampshire, 2, 17, 18. New Jersey, 2, 3, 6, 7, 14. New Mexico, 14, 15, 16, 17, 18, 28. New York, 2, 7, 18. North Carolina, 4, 7, 20, 22, 28. Oklahoma, 15. Oregon, 2, 7, 11. Pennsylvania, 3, 7, 22, 29. Rhode Island, 19. South Dakota, 4, 9, 10, 14, 15, 25, 26, 27, 28. Tennessee, 16, 17. Texas, 11, 12, 13. Utah, 8, 9, 23, 27, 29. Washington, 3, 13, 15, 27. West Virginia, 1. Wisconsin, 1, 9, 17, 20, 21, 24, 25. Wyoming, 10, 11, 13, 15.

In Canada.—Professor Stupart says:

The rainfall was much below the average over the greater portion of Quebec and throughout the Maritime Provinces. In Manitoba it was for the most part just about the average, but in all the other portions, except in a few isolated localities, it was above the average, and in many localities to a large amount. In Alberta, Edmonton reports the phenomenal rainfall of 11.1 inches, being no less than 8.1 inches above the average. Regina also records an abnormal rainfall of 7.6 inches, and Gatesgarth of 6.13 inches. In Ontario the rainfall was excessive in many districts, more especially in the Georgian Bay and Muskoka regions, where generally the waters of the small inland lakes are reported to be higher now than they were at the spring freshets. Parry Sound recorded 7.9 inches, which is 5.3 inches above the average. The excessive rainfalls in these districts are more remarkable when it is considered that farther to the northward, in the Temiscamingue and northern Ottawa River localities the country suffered from drought and disastrous bush fires. In the Maritime Provinces, Chatham, N. B., was 2.7 inches below average, Halifax, 2.4 inches below, and Charlottetown, 2.3 inches below.

SUNSHINE AND CLOUDINESS.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

Except on the Atlantic and west Gulf coasts and over the lower lakes, the average amount of sunshine was in excess of the normal and cloudiness correspondingly below normal.

The averages for the various districts, with departures from the normal, are shown in the table below:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	6.0	+1.1	Missouri Valley	2.8	—1.6
Middle Atlantic	5.5	+0.7	Northern Slope	2.6	—1.2
South Atlantic	5.0	0.0	Middle Slope	3.4	—0.6
Florida Peninsula	5.6	+0.6	Southern Slope	4.0	+0.2
East Gulf	5.0	0.0	Southern Plateau	2.9	—0.4
West Gulf	4.4	+0.2	Middle Plateau	2.1	+0.1
Ohio Valley and Tennessee	3.5	—1.1	Northern Plateau	2.0	—1.1
Lower Lake	4.2	—0.3	North Pacific Coast	4.9	+0.5
Upper Lake	5.0	+0.3	Middle Pacific Coast	2.5	—0.4
North Dakota	3.7	—0.6	South Pacific Coast	2.1	—0.6
Upper Mississippi	3.2	—1.1			

HUMIDITY.

Over the area covered by the hot wave and drought, the relative humidity was much below the normal, a condition which contributed much to alleviate the suffering to human and animal life compelled to endure day after day the intense heat that prevailed during the month.

The averages by districts appear in the subjoined table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	81	+ 2	Missouri Valley	54	—13
Middle Atlantic	77	+ 5	Northern Slope	54	+ 2
South Atlantic	80	0	Middle Slope	50	—11
Florida Peninsula	80	0	Southern Slope	55	— 3
East Gulf	75	— 4	Southern Plateau	39	— 3
West Gulf	70	— 3	Middle Plateau	31	— 1
Ohio Valley and Tennessee	65	— 4	Northern Plateau	41	— 2
Lower Lake	70	+ 2	North Pacific Coast	71	— 6
Upper Lake	73	+ 2	Middle Pacific Coast	59	— 8
North Dakota	74	+ 8	South Pacific Coast	63	0
Upper Mississippi	57	—11			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Block Island, R. I	2	52	nw.	Marquette, Mich	20	68	sw.
Cape Henry, Va	31	70	nw.	Minneapolis, Minn	28	50	nw.
Chicago, Ill	18	56	se.	Mount Tamalpais, Cal.	15	50	nw.
Cleveland, Ohio	11	51	nw.	Do	16	62	nw.
Dodge, Kan.	27	56	se.	Do	21	52	nw.
El Paso, Tex	1	60	ne.	Do	23	51	nw.
Do	18	57	ne.	New York, N. Y	28	54	nw.
Hatteras, N. C	10	52	n.	Do	31	66	sw.
Do	11	62	w.	San Juan, P. R	7	52	ne.
Lexington, Ky	25	50	n.				

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IV, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—Reports of 7,732 thunderstorms were received during the current month as against 6,376 in 1900 and 6,670 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 17th, 476; 4th, 402; 2d, 379; 29th, 373.

Reports were most numerous from: Missouri, 509; Ohio, 411; New Jersey, 325.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz: June 27 to July 5.

In Canada.—Thunderstorms were reported as follows: Halifax, 15; Yarmouth, 17, 18, 22; Charlottetown, 17, 22; Father Point, 4, 16, 21; Quebec, 2, 10, 15, 16, 18, 21; Montreal, 2, 17, 18; Bissett, 1, 18, 20; Ottawa, 7, 17; Kingston, 1, 6, 18, 21; Toronto, 3, 4, 6, 16, 17, 21, 29; White River, 1, 9, 17, 20, 24; Port Stanley, 11, 16, 22, 26, 29; Saugeen, 5, 10, 21; Parry Sound, 1, 5, 27; Port Arthur, 3, 15, 20, 21, 24; Winnipeg, 13; Minnedosa, 13, 14; Qu'Appelle, 2, 3, 4, 10, 12, 13, 14, 16, 17, 18, 24, 25, 26, 27, 28; Medicine Hat, 3, 25, 26, 27, 28; Calgary, 3, 25, 26, 28; Banff, 2, 8, 9, 20, 26, 27; Edmonton, 3, 10, 16, 19, 24, 26; Prince Albert, 19, 23, 24, 25, 26, 27; Battleford, 6, 10, 13, 17, 20, 23; Barkerville, 18; Hamilton, Bermuda, 20.

Auroras were reported as follows: Quebec, 11.

In Cuba and Porto Rico, weather conditions were generally favorable for the sowing, growth, and harvesting of the various crops.

DESCRIPTION OF TABLES AND CHARTS.

By ALFRED J. HENRY, Professor of Meteorology.

Table I gives, for about 145 Weather Bureau stations making two observations daily and for about 25 others making only one observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation, the total depth of snowfall, and the mean wet-bulb temperatures. The altitudes of the instruments above ground are also given.

Table II gives, for about 2,700 stations occupied by voluntary observers, the highest maximum and the lowest minimum temperatures, the mean temperature deduced from the average of all the daily maxima and minima, or other readings, as indicated by the numeral following the name of the station; the total monthly precipitation, and the total depth in inches of any snow that may have fallen. When the spaces in the snow column are left blank it indicates that no snow has fallen, but when it is possible that there may have been snow of which no record has been made, that fact is indicated by leaders, thus (. . . .).

Table III gives, for all stations that make observations at